541,568

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 29 July 2004 (29,07,2004)

PCT

(10) International Publication Number WO 2004/063743 A1

(51) International Patent Classification⁷: G01N 33/00, 27/00, E21B 47/01

(21) International Application Number:

PCT/GB2003/002345

(22) International Filing Date: 28 May 2003 (28.05.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 0300812.5

15 January 2003 (15.01.2003) GB

(71) Applicants (for all designated States except US): SCHLUMBERGER TECHNOLOGY B.V. [NL/NL]; Parkstraat 83-89, NL-2514 JG The Hague (NL). PETROLEUM RESEARCH AND DEVELOPMENT N.V. [NL/NL]; De Ruyterkade 62, Willemstad, Curacao (AN). SCHLUMBERGER CANADA LIMITED [CA/CA]; 525 - 3rd Avenue S.W., Calgary, Alberta T2P 0G4 (CA).

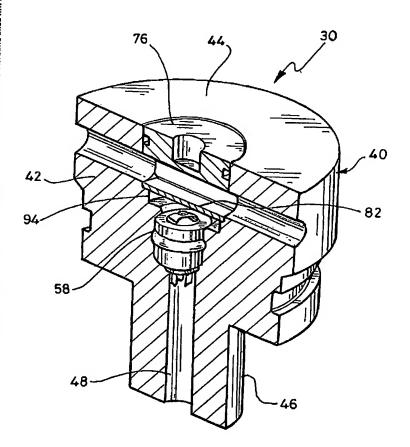
SCHLUMBERGER HOLDINGS LIMITED [—/—]; P.O. Box 71, Craigmuir Chambers, Road Town, Tortola (VG). SCHLUMBERGER OILFIELD ASSISTANCE LIMITED [—/—]; Craigmuir Chambers, Road Town, Tortola (VG). SCHLUMBERGER OVERSEAS S.A. [PA/PA]; 8 Calle Aquillo de la Guardia, Panama City (PA). SCHLUMBERGER SERVICES LIMITED [—/—]; P.O. Box 438, Tortola (VG). SCHLUMBERGER SURENCO S.A. [PA/PA]; 8 Calle Aquilino de la Guardia, Panama City (PA). SERVICES PETROLIERS SCHLUMBERGER [FR/FR]; 42, rue Saint Dominique, F-75007 Paris (FR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): JIANG, Li [CN/GB]; 47 Almoners Avenue, Cambridge CB1 8NZ (GB). JONES, Timothy, Gareth, John [GB/GB]; 16 Denmark Road, Cottenham, Cambridgeshire CB4 8QS (GB). BROWN, Jonathan, Webster [GB/US]; 22 Ferncastle Lane, Sugar Land, TX 77479-5551 (US). GILBERT,

[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR THE MEASUREMENT OF HYDROGEN SULPHIDE AND THIOLS IN FLUIDS



(57) Abstract: An electrochemical sensor for measuring the amount of hydrogen sulphide or thiols in a fluid in a wellbore comprises a temperature- and pressure-resistant housing containing a flow path for the fluids. The fluids flow over one side of a gas permeable membrane made of zeolite or a suitable ceramic material, the other side of the membrane being exposed to a chamber containing a reaction solution which together with the hydrogen sulphide or thiols create a redox reaction resulting in an electrical current dependent upon the amount of hydrogen sulphide or thiols in the fluid.

WO 2004/063743 A1

- Andrew [GB/GB]; 26 South Anderson Drive, Aberdeen AB10 7HJ (GB).
- (74) Agent: WANG, William, L.; Schlumberger Cambridge Research Limited, Intellectual Property Law Department, High Cross, Madingley Road, Cambridge CB3 0EL (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.